WHAT IS CLAIMED IS:

1. A method for calculating available power of a battery, comprising:

calculating an equivalent charge resistance at a current charge current, a current SOC (state of charge), and a current battery temperature using predetermined equivalent charge resistance data;

calculating an effective no-load charge voltage at the current charge current, the current SOC, and the current battery temperature using predetermined effective no-load charge voltage data;

calculating a maximum charge current based on the equivalent charge resistance, the effective no-load charge voltage, and a predetermined maximum charge voltage; and

calculating available charge power based on the maximum charge current, the predetermined maximum charge voltage, and a predetermined battery maximum current.

2. The method of claim 1, wherein the maximum charge current is calculated by dividing a difference between the predetermined maximum charge voltage and the effective no-load charge voltage by the equivalent charge resistance.

3. The method of claim 1, wherein in calculating available charge power, the available charge power is calculated by multiplying the predetermined maximum charge voltage by the predetermined battery maximum current if the maximum charge current is greater than the predetermined battery maximum current, and the available charge power is calculated by multiplying the predetermined maximum charge voltage by the maximum charge current if the maximum charge current is not greater than the predetermined battery maximum current.

4. The method of claim 1, further comprising renewing a charge voltage feedback factor based on the current battery voltage and the predetermined maximum charge voltage, and wherein in calculating available charge power, the available charge power is based on the maximum charge current, the predetermined maximum charge voltage, the predetermined battery maximum current, and the charge voltage feedback

factor.

5. The method of claim 4, wherein in calculating available charge power, the available charge power is calculated through a multiplication of the predetermined maximum charge voltage, the predetermined battery maximum current, and the charge voltage feedback factor if the maximum charge current is greater than the predetermined battery maximum current, and the available charge power is calculated through a multiplication of the predetermined maximum charge voltage, the maximum charge current, and the charge voltage feedback factor if the maximum charge current is not greater than the predetermined battery maximum current.

6. The method of claim 4, wherein in renewing a charge voltage feedback factor, the charge voltage feedback factor is decreased by a first predetermined value if the current battery voltage is greater than the predetermined maximum charge voltage, and the charge voltage feedback factor is increased by a second predetermined value if the current battery voltage is not greater than the predetermined maximum charge voltage.

7. The method of claim 6, wherein in renewing a charge voltage feedback factor, the charge voltage feedback factor is set as 1 if the changed charge voltage feedback factor is greater than 1, and the charge voltage feedback factor is set as 0 if the changed charge voltage feedback factor is less than 0.

8. The method of claim 1, wherein the equivalent charge resistance data include a plurality of equivalent charge resistances respectively at predetermined charge current ranges, predetermined SOCs, and predetermined battery temperatures.

9. The method of claim 8, wherein the equivalent charge resistance at the current charge current, the current SOC, and the current battery temperature are calculated through interpolation using the equivalent charge resistance data.

10. The method of claim 1, wherein the effective no-load charge voltage

data include a plurality of effective no-load charge voltages respectively at predetermined charge current ranges, predetermined SOCs, and predetermined battery temperatures.

11. The method of claim 10, wherein the effective no-load charge voltage at the current charge current, the current SOC, and the current battery temperature are calculated through interpolation using the effective no-load charge voltage data.

12. A method for calculating available power of a battery, comprising:

calculating an equivalent discharge resistance at a current discharge current, a current SOC (state of charge), and a current battery temperature using predetermined equivalent discharge resistance data;

calculating an effective no-load discharge voltage at the current discharge current, the current SOC, and the current battery temperature using predetermined effective no-load discharge voltage data;

calculating a maximum discharge current based on the equivalent discharge resistance, the effective no-load discharge voltage, and a predetermined minimum discharge voltage;

calculating a discharge terminal voltage based on the maximum discharge current, the effective no-load discharge voltage, the equivalent discharge resistance, and a predetermined battery maximum current; and

calculating available discharge power based on the maximum discharge current and the discharge terminal voltage.

13. The method of claim 12, wherein the maximum discharge current is calculated by dividing a difference between the effective no-load discharge voltage and the predetermined minimum discharge voltage by the equivalent discharge resistance.

14. The method of claim 12, wherein in calculating a discharge terminal voltage, the discharge terminal voltage is calculated as a difference between the effective no-load discharge voltage and a multiplication of the predetermined battery maximum current and the equivalent discharge resistance if the maximum discharge

current is greater than the predetermined battery maximum current, and the discharge terminal voltage is calculated as a difference between the effective no-load discharge voltage and a multiplication of the maximum discharge current and the equivalent discharge resistance if the maximum discharge current is not greater than the predetermined battery maximum current.

15. The method of claim 14, wherein in calculating available discharge power, the available discharge power is calculated through a multiplication of the discharge terminal voltage and the maximum discharge current.

16. The method of claim 12, further comprising renewing a discharge voltage feedback factor based on the current battery voltage and the predetermined minimum discharge voltage, and wherein in calculating available discharge power, the available discharge power is calculated based on the maximum discharge current, the discharge terminal voltage, and the discharge voltage feedback factor.

17. The method of claim 16, wherein in calculating a discharge terminal voltage, the discharge terminal voltage is calculated as a difference between the effective no-load discharge voltage and a multiplication of the predetermined battery maximum current and the equivalent discharge resistance if the maximum discharge current is greater than the predetermined battery maximum current, and the discharge terminal voltage is calculated as a difference between the effective no-load discharge voltage and a multiplication of the maximum discharge current and the equivalent discharge resistance if the maximum discharge current is not greater than the predetermined battery maximum current.

18. The method of claim 17, wherein in calculating available discharge power, the available discharge power is calculated through a multiplication of the discharge terminal voltage, the maximum discharge current, and the discharge voltage feedback factor.

19. The method of claim 16, wherein in renewing a discharge voltage

feedback factor, the discharge voltage feedback factor is decreased by a first predetermined value if the current battery voltage is less than the predetermined minimum discharge voltage, and the discharge voltage feedback factor is increased by a second predetermined value if the current battery voltage is not less than the predetermined minimum discharge voltage.

20. The method of claim 19, wherein in renewing a discharge voltage feedback factor, the discharge voltage feedback factor is set as 1 if the changed discharge voltage feedback factor is greater than 1, and the discharge voltage feedback factor is set as 0 if the changed discharge voltage feedback factor is less than 0.

21. The method of claim 12, wherein the equivalent discharge resistance data include a plurality of equivalent discharge resistances respectively at predetermined discharge current ranges, predetermined SOCs, and predetermined battery temperatures.

22. The method of claim 21, wherein the equivalent discharge resistance at the current discharge current, the current SOC, and the current battery temperature are calculated through interpolation using the equivalent discharge resistance data.

23. The method of claim 12, wherein the effective no-load discharge voltage data include a plurality of effective no-load discharge voltages respectively at predetermined discharge current ranges, predetermined SOCs, and predetermined battery temperatures.

24. The method of claim 23, wherein the effective no-load discharge voltage at the current discharge current, the current SOC, and the current battery temperature are calculated through interpolation using the effective no-load discharge voltage data.

25. A system for calculating available power of a battery, comprising:

a battery temperature sensor detecting a temperature of the battery and outputting a corresponding signal;

a battery current sensor detecting a current of the battery and outputting a corresponding signal;

a battery voltage sensor detecting a voltage of the battery and outputting a corresponding signal; and

a battery control unit receiving signals from the battery temperature sensor, the battery current sensor, and the battery voltage sensor,

wherein the battery control unit is programmed to perform control logic comprising:

calculating an equivalent charge resistance at a current charge current, a current SOC (state of charge), and a current battery temperature using predetermined equivalent charge resistance data;

calculating an effective no-load charge voltage at the current charge current, the current SOC, and the current battery temperature using predetermined effective no-load charge voltage data;

calculating a maximum charge current based on the equivalent charge resistance, the effective no-load charge voltage, and a predetermined maximum charge voltage; and

calculating available charge power based on the maximum charge current, the predetermined maximum charge voltage, and a predetermined battery maximum current.

26. The system of claim 25, wherein the maximum charge current is calculated by dividing a difference between the predetermined maximum charge voltage and the effective no-load charge voltage by the equivalent charge resistance.

27. The system of claim 25, wherein in calculating available charge power, the available charge power is calculated by multiplying the predetermined maximum charge voltage by the predetermined battery maximum current if the maximum charge current is greater than the predetermined battery maximum current, and the available charge power is calculated by multiplying the predetermined maximum charge voltage by the maximum charge current if the maximum charge current is not greater than the predetermined battery maximum current.

28. The system of claim 25, wherein the control logic further comprises renewing a charge voltage feedback factor based on the current battery voltage and the predetermined maximum charge voltage, and wherein in calculating available charge power, the available charge power is based on the maximum charge current, the predetermined maximum charge voltage, the predetermined battery maximum current, and the charge voltage feedback factor.

29. The system of claim 28, wherein in calculating available charge power, the available charge power is calculated through a multiplication of the predetermined maximum charge voltage, the predetermined battery maximum current, and the charge voltage feedback factor if the maximum charge current is greater than the predetermined battery maximum current, and the available charge power is calculated through a multiplication of the predetermined maximum charge voltage, the maximum charge current, and the charge voltage feedback factor if the maximum charge current is not greater than the predetermined battery maximum current.

30. The system of claim 28, wherein in renewing a charge voltage feedback factor, the charge voltage feedback factor is decreased by a first predetermined value if the current battery voltage is greater than the predetermined maximum charge voltage, and the charge voltage feedback factor is increased by a second predetermined value if the current battery voltage is not greater than the predetermined maximum charge voltage.

31. The system of claim 30, wherein in renewing a charge voltage feedback factor, the charge voltage feedback factor is set as 1 if the changed charge voltage feedback factor is greater than 1, and the charge voltage feedback factor is set as 0 if the changed charge voltage feedback factor is less than 0.

32. A system for calculating available power of a battery comprising:

a battery temperature sensor detecting a temperature of the battery and outputting a corresponding signal;

a battery current sensor detecting a current of the battery and outputting a corresponding signal;

a battery voltage sensor detecting a voltage of the battery and outputting a corresponding signal; and

a battery control unit receiving signals from the battery temperature sensor, the battery current sensor, and the battery voltage sensor,

wherein the battery control unit is programmed to perform control logic comprising:

calculating an equivalent discharge resistance at a current discharge current, a current SOC (state of charge), and a current battery temperature using predetermined equivalent discharge resistance data;

calculating an effective no-load discharge voltage at the current discharge current, the current SOC, and the current battery temperature using predetermined effective no-load discharge voltage data;

calculating a maximum discharge current based on the equivalent discharge resistance, the effective no-load discharge voltage, and a predetermined minimum discharge voltage;

calculating a discharge terminal voltage based on the maximum discharge current, the effective no-load discharge voltage, the equivalent discharge resistance, and a predetermined battery maximum current; and

calculating available discharge power based on the maximum discharge current and the discharge terminal voltage.

33. The system of claim 32, wherein the maximum discharge current is calculated by dividing a difference between the effective no-load discharge voltage and the predetermined minimum discharge voltage by the equivalent discharge resistance.

34. The system of claim 32, wherein in calculating a discharge terminal voltage, the discharge terminal voltage is calculated as a difference between the effective no-load discharge voltage and a multiplication of the predetermined battery maximum current and the equivalent discharge resistance if the maximum discharge current is greater than the predetermined battery maximum current, and the discharge

terminal voltage is calculated as a difference between the effective no-load discharge voltage and a multiplication of the maximum discharge current and the equivalent discharge resistance if the maximum discharge current is not greater than the predetermined battery maximum current.

35. The system of claim 34, wherein in calculating available discharge power, the available discharge power is calculated through a multiplication of the discharge terminal voltage and the maximum discharge current.

36. The system of claim 32, wherein the control logic further comprises renewing a discharge voltage feedback factor based on the current battery voltage and the predetermined minimum discharge voltage, and wherein in calculating available discharge power, the available discharge power is calculated based on the maximum discharge current, the discharge terminal voltage, and the discharge voltage feedback factor.

37. The system of claim 36, wherein in calculating a discharge terminal voltage, the discharge terminal voltage is calculated as a difference between the effective no-load discharge voltage and a multiplication of the predetermined battery maximum current and the equivalent discharge resistance if the maximum discharge current is greater than the predetermined battery maximum current, and the discharge terminal voltage is calculated as a difference between the effective no-load discharge voltage and a multiplication of the maximum discharge current and the equivalent discharge resistance if the maximum discharge current is not greater than the predetermined battery maximum current.

38. The system of claim 37, wherein in calculating available discharge power, the available discharge power is calculated through a multiplication of the discharge terminal voltage, the maximum discharge current, and the discharge voltage feedback factor.

39. The system of claim 36, wherein in renewing a discharge voltage

feedback factor, the discharge voltage feedback factor is decreased by a first predetermined value if the current battery voltage is less than the predetermined minimum discharge voltage, and the discharge voltage feedback factor is increased by a second predetermined value if the current battery voltage is not less than the predetermined minimum discharge voltage.

40. The system of claim 39, wherein in renewing a discharge voltage feedback factor, the discharge voltage feedback factor is set as 1 if the changed discharge voltage feedback factor is greater than 1, and the discharge voltage feedback factor is set as 0 if the changed discharge voltage feedback factor is less than 0.